

Applic. No. : 09/761,594

Claim 21 (previously presented). The method according to claim 3, wherein the small balls disposed on the conductive material are metallized plastic balls.

Claim 22 (previously presented). The method according to claim 3, wherein the conductive material introduced into the opening has a cylinder shape in the openings.

Claim 23 (previously presented). The method according to claim 3, wherein the applied second insulating layer is thicker than the applied first insulating layer.

Claim 24 (previously presented). The method according to claim 3, wherein the applied second insulating layer is at least four times thicker than the applied first insulating layer.

Claim 25 (cancelled).

Applic. No. : 09/761,594.

Remarks:

Reconsideration of the application is requested.

Claims 1-5 and 11-24 are now in the application. Claims 1 and 3 have been amended. Claim 25 has been cancelled. Claims 11-12 and 18 have been withdrawn from consideration.

In item 3 on page 2 of the above-identified Office action, claims 1-2, 13-17, and 25 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, the Examiner stated that "newly added claim 25 creates confusion for the interpretation of claim 1". The Examiner is correct that claim 1 implicitly recites that the variables are selected to obtain the desired mechanical decoupling, while claim 25 expressly recites that the variables are selected to obtain the desired mechanical decoupling.

Furthermore, the Examiner asked: "Does it mean that it is desired to have mechanical decoupling or is it desired to have a specific degree of mechanical decoupling?"

The Examiner's comments have been considered and the appropriate corrections have been made to claims 1 and 3.

Applic. No. : 09/761,594

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, Counsel would appreciate a telephone call during which the matter may be resolved. The above-noted changes to claim 1 and 3 are provided solely for the purpose of satisfying formal requirements, clarification, or are made solely for cosmetic reasons to clarify the claims. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claims for any reason related to the statutory requirements for a patent.

In item 5 on page 3 of the Office action, claims 1-5 and 13-17, and 19-25 have been rejected as being obvious over Akagawa et al. (EP 0 734 059) in view of Farnworth et al. (US 6,639,600), Akram et al. (US 6,107,109), and IBM Technical Bulletin, "Solder Plated Resin Ball", Vol. 38, pages 463-464 (May 1995) under 35 U.S.C. § 103.

The rejection and the Examiner's comments have been considered. However, as will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Applic. No. : 09/761,594

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 (similarly claim 3) as amended calls for, *inter alia*:

A semiconductor device in chip format, comprising:

said thickness of said second insulating layer, said elasticity of said conductive material, and said elasticity of said small balls being selected for **obtaining a desired level of mechanical decoupling** from a printed circuit board upon the semiconductor component being soldered onto the printed circuit board.

In the Response to Arguments, on pages 6-7 of the Office action, the Examiner stated that:

As noted above, claims 1, 3, and 25 do not actually require the semiconductor component to be soldered to the printed circuit board and have the desired mechanical decoupling, but rather require that the semiconductor component be capable of being soldered to a printed circuit board and being mechanically decoupled upon the soldering operation. The product of Akagawa et al, as modified above, is capable of being soldered to a printed circuit board, in light of the fact that the small balls have an outer coating of solder. Furthermore, the product of Akagawa has the claimed properties of the second insulation layer, the conductive adhesive, and the small balls and only the expected results would be achieved upon soldering to a printed circuit board, namely mechanical decoupling.

The inventive concept of the invention of the instant application is to use a particular combination of (i) thickness of an insulating layer, (ii) elasticity of a conductive material, and (iii) elasticity of small balls in

Applic. No. : 09/761,594

order to achieve a desired level of mechanical decoupling of a semiconductor component from a printed circuit board when the semiconductor component is soldered onto the printed circuit board.

None of the applied references is concerned with the decoupling of a semiconductor component from a printed circuit board. None of the applied references suggest using such a particular combination of variables as recited in the claims for achieving a desired level of mechanical decoupling from a printed circuit board when a semiconductor component is soldered onto the printed circuit board.

Without a conceptional or functional realization (in other words: "some suggestion or motivation to combine the references" together with "a reasonable expectation of success") of this inventive concept, the present invention cannot be obvious over the applied references.

As discussed in MPEP § 2112, a limitation recited in a claim that is not expressly or implicitly disclosed in a prior art reference is inherently disclosed therein if, and only if, the "missing" limitation is necessarily present in the prior art, and that it would be so recognized by persons of ordinary skill. The principles of inherency require that the inherency be absolute, and not probabilistic. As far as Applicants were

Applic. No. : 09/761,594

able to ascertain, there is no disclosure or suggestion in Akagawa et al. that it is **absolutely necessary** that "the product derived of Akagawa et al.", as modified by the Examiner, has "the expected results ..., namely mechanical decoupling" as asserted by the Examiner.

According to MPEP 2173.05, "a functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used."

MPEP 2173.05 contains the following two examples of functional limitations that have been given patentable weight.

It was held that the limitation used to define a radical on a chemical compound as "incapable of forming a dye with said oxidizing developing agent" although functional, was perfectly acceptable because it set definite boundaries on the patent protection sought. *In re Barr*, 444 F.2d 588, 170 USPQ 33 (CCPA 1971). In a claim that was directed to a kit of component parts capable of being assembled, the Court held that limitations such as "members adapted to be positioned" and "portions . . . being resiliently dilatable whereby said housing may be slidably positioned" serve to precisely define present structural attributes of interrelated component parts of the claimed assembly. *In re Venezia*, 530 F.2d 956, 189 USPQ 149 (CCPA 1976).

Hence, it is believed that the functional features "obtaining a desired level of mechanical decoupling" must be given full patentable weight.

Applic. No. : 09/761,594

In order to establish a *prima facie* case of obviousness by modifying or combining reference teachings, MPEP § 2143 requires that:

- there must be **some suggestion or motivation** to combine the references in the prior art;
- there must be a **reasonable expectation of success** to be found in the prior art; and
- the prior art references must teach or suggest **all** the claim limitations.

It is therefore believed that the Examiner has not satisfied any one of the three criteria for establishing a *prima facie* case of obviousness by modifying or combining reference teachings, as required by MPEP § 2143.

It is accordingly believed to be clear that the references do not suggest the features of claims 1 and 3. Claims 1 and 3 are, therefore, believed to be patentable over the art and because claims 2, 4-5, and 11-24 are ultimately dependent on either claims 1 or claim 3, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-5 and 11-24 are solicited.

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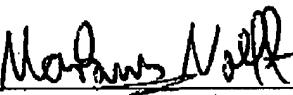
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Applic. No. : 09/761,594

If an extension of time is required, petition for extension is  
herewith made.

Please charge any fees that might be due with respect to  
Sections 1.16 and 1.17 to the Deposit Account of Lerner and  
Greenberg, P.A., No. 12-1099.

Respectfully submitted,

  
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